

A Supposedly Extinct Bivalve Species Found Living off California

(Mollusca : Bivalvia : Mactridae)

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(1 Plate)

TWO KNOWN LIVING SPECIES of *Tresus* (Gray, 1853), occur along the Pacific coast of North America. *Tresus nuttalli* (Conrad, 1837) ranges from Wrangell, Alaska, to San Diego, California, and *T. capax* (Gould, 1850) ranges from Kodiak Island, Alaska, to San Francisco, California (DALL, 1921). Both species occur in lower intertidal sand and silty-sand of coastal bays and estuaries. Additionally, a fossil species, *T. (Venus) pajaroana* (Conrad, 1857), was described from middle Miocene deposits (ARNOLD & HANNIBAL, 1913) through uppermost Pliocene deposits (ADEGOKE, 1969) of the Pacific coast mountain ranges. The reported geographical range of *T. pajaroana* is from the Pajaro River, Santa Cruz, California (CONRAD, 1857) to Grays Harbor County, Washington (WEAVER, 1942).

On April 22, 1969, following a period of stormy weather and unusually rough seas, approximately 40 live clams of the genus *Tresus* were collected from approximately 50 crabpots set in about 7.2 meters off Clam Beach, Humboldt County, California (Lat. 41°00' N, Long. 124°08' W). The clams evidently had been dislodged from their burrows and deposited in or on the crabpots by the influence of large waves on the sandy bottom. Only two specimens were obtained by the authors. The remainder of the clams were eaten by the fishermen. On April 25, 1969, 25

additional clams were collected from crabpots set at unknown depths off Orick, California, about 30 km north of Clam Beach. The Orick specimens were necrotic when gathered, thus only the valves were saved. Neither the valve characteristics nor the anatomy of the crabpot specimens fit the descriptions of either *T. nuttalli* or *T. capax*. However, the valve characteristics fit Conrad's description of the fossil species *T. pajaroana*. Thus we conclude that the formerly considered extinct species, *T. pajaroana*, lives off the coast of northern California.

After Conrad's discovery of *Tresus pajaroana* in 1857 other authors located fossil specimens of *T. pajaroana* in the coastal mountain ranges of California, Oregon, and Washington. Some of the locations where specimens have been found include the San Pablo and Etchegoin Formations of central California (CLARK, 1915), Purisima and Merced Formations near San Francisco (ARNOLD & HANNIBAL, 1913) Wildcat Formation in Humboldt County, northern California (MARTIN, 1916; Robert Talmadge, pers. comm.), Empire Formation near Coos Bay, Oregon (ARNOLD & HANNIBAL, *op. cit.*) and the Montesano Formation of Washington (GRANT & GALE, 1931). Even though *T. pajaroana* has been found in various locations, none of the above authors has reported finding more than just a few specimens. ADEGOKE's (1969) investigation of the Coalinga Region of California showed that *T. pajaroana* occurred sparsely in only 13 of the 125 samples collected from strata with which *T. pajaroana* is associated. All of

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the published literature which was reviewed by the authors reported *T. pajaroana* as extinct after the Pliocene Period.

SHELL MORPHOLOGY

CONRAD (1837) originally described *T. pajaroana* as follows:

Shell obliquely ovate-obtuse, ventricose, very inequilateral; anterior margin obtusely rounded, posterior side sub-cuneiform; posterior end truncated obliquely inwards.

This description fits very closely the valve characteristics of the crabpot specimens (Figures 1 & 2). Additionally, GRANT & GALE (1931) presented figures of *T. pajaroana* [*Schizothaerus nuttalli* variety *pajaroana*] leaving little doubt that the crabpot specimens belong to *T. pajaroana*. Grant and Gale point out in their figures the lesser ventricosity of *T. pajaroana* as compared with *T. nuttalli*. The valves of the crabpot specimens also differed from those of *T. nuttalli* and *T. capax* in the following ways: The valves were less ventricose, much thinner, less prominent annuli (growth rings), and a thinner, lighter-colored periostracum.

ANATOMY

The anatomy of *Tresus pajaroana* differs from *T. nuttalli* and *T. capax* in several aspects.

1. **Siphon:** *Tresus pajaroana* has a much slimmer siphon, smaller siphonal tabs, and a lighter, thinner periostracum. The siphon is especially slim at the tip, whereas, *T. nuttalli* and *T. capax* have very stout siphons and siphonal tabs.

2. **Labial palps:** The labial palps of *Tresus nuttalli* and *T. capax* are small and extend approximately one-half the distance of the visceral mass, whereas, the labial palps of *T. pajaroana* are large and extend almost to the posterior margin of the visceral mass.

3. **Visceral skirt:** The visceral skirt of *Tresus capax* as described by PEARCE (1965) does not exist in either *T. nuttalli* or *T. pajaroana*.

4. **Ctenidia:** The ctenidia of *Tresus pajaroana* are larger, noticeably thinner, and more coarsely rugose than the ctenidia of *T. capax* and *T. nuttalli*.

5. **Spring Gonad:** The gonads of the two live specimens of *Tresus pajaroana* were apparently at or near maturity

when gathered on April 22, 1969. In Humboldt Bay, *T. nuttalli* has apparently mature gametes throughout the year while *T. capax* is a winter spawner and usually has spent gonads during April (MACHELL & DEMARTINI, 1971).

6. **Commensals:** Pea crabs (*Pinnixa* sp.) were isolated from the two whole specimens of *Tresus pajaroana* and observed in many of the necrotic specimens collected later. In Humboldt Bay, pea crabs are very common in *T. capax* but occur only rarely in *T. nuttalli*. The commensal nemertine *Malobcobbella grossa* also was found in the mantle cavity of the two live specimens of *T. pajaroana*. *Malobcobbella grossa* rarely occurs in either *T. capax* or *T. nuttalli* from Humboldt Bay.

HABITAT AND DENSITY

STOUT (1967) and DINNEL, *et al*, (in manuscript) studied the ecology of *Tresus capax* and *T. nuttalli* in Humboldt Bay. No specimens of *T. pajaroana* were recovered from Humboldt Bay. Thus *T. pajaroana* appears to reside in an entirely benthic habitat. The quantity of live *T. pajaroana* recovered from the crabpots indicates that their density may be relatively high in at least two areas along the coast. In addition to live *T. pajaroana*, valves have been recovered from crabpots along the other areas of the Humboldt coastline (John Span, pers. comm.). Robert Talmadge (pers. comm.) has also reported that one valve of *T. pajaroana* has been recovered by a dragboat from approximately 45 m near Redding Rock off Orick, California.

The authors have investigated the composition of *Tresus* valves washed up on the beach between Orick, California and the entrance to Humboldt Bay. We found that a substantial percentage of the *Tresus* valves were identifiable as *T. pajaroana*. We speculate that the *T. pajaroana* valves have been continuously overlooked because of their close similarity to the valves of *T. capax*, especially in a weathered condition.

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Photography was provided by Mr. James Gilbert of Gilbert Studio, Panama City, Florida.

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Explanation of Figures 1, 2

- Figure 1: Lateral Aspect of the Left Valve of *Tresus pajaroana*
Figure 2: Posterior Aspect Showing Siphonal Gape and Ventricle of *Tresus pajaroana*